

The Early Writing Skills of Children Identified as At-Risk for Literacy Difficulties

Leiah J.G. Thomas

The Ohio State University

Hope K. Gerde

Michigan State University

Shayne B. Piasta and Jessica A.R. Logan

The Ohio State University

Laura L. Bailet

Kaplan Early Learning Company

Cynthia M. Zettler-Greeley

Nemours Children's Health System

This work is licensed under the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License. To view a copy of this license, visit <http://creativecommons.org/licenses/by-nc-nd/4.0/> or send a letter to Creative Commons, PO Box 1866, Mountain View, CA 94042, USA.

This article was peer-reviewed by a double-blind review process at Early Childhood Research Quarterly. As outlined by the journal, "All contributions will be initially assessed by the editor for suitability for the journal. Papers deemed suitable are then typically sent to a minimum of two independent expert reviewers to assess the scientific quality of the paper. The Editor is responsible for the final decision regarding acceptance or rejection of articles. The Editor's decision is final. This journal uses double-blind review, which means the identified of the authors are concealed from the reviewers, and vice versa." For more information on the peer-review process, visit: <https://www.elsevier.com/journals/early-childhood-research-quarterly/0885-2006/guide-for-authors>

<https://doi.org/10.1016/j.ecresq.2020.01.003>

Published 22 January 2020 in *Early Childhood Research Quarterly*

Author Note

Leiah J.G. Thomas, Department of Teaching and Learning and the Crane Center for Early Childhood Research and Policy, The Ohio State University; Hope K. Gerde, Department of Human Development and Family Studies, Michigan State University; Shayne B. Piasta, Department of Teaching and Learning and the Crane Center for Early Childhood Research and Policy; Jessica A.R. Logan, Department of Educational Studies; Laura L. Bailet, Kaplan Early Learning Company; Cynthia M. Zettler-Greeley, Nemours Children's Health System.

The research reported here was supported by the Institute of Education Sciences, U.S. Department of Education, through Grant R305A160261 awarded to The Ohio State University (Piasta). The opinions expressed are those of the authors and do not represent views of the Institute or U.S. Department of Education. The authors gratefully acknowledge project co-investigator Kandia Lewis as well as research project staff, the cooperation of the Ready4Success initiative as led by Shelby Dowdy, and the Nemours BrightStart! program. The authors also recognize the research staff and participating children/families without whom this research would not be possible.

Correspondence concerning this article should be addressed to Leiah J.G. Thomas, Department of Teaching and Learning, The Ohio State University, Columbus, OH 43210. Email:

leiahgroom@gmail.com or groom.33@buckeyemail.osu.edu

Abstract

Early writing is a foundational skill related to young children's literacy development and later reading and writing achievement. Examining children's early writing skills, particularly for those who have been identified as at-risk for later literacy difficulties, is critical to understanding potential differences in the early writing of these children and supports children need as their writing skills develop. Yet, we have an unclear understanding of the writing skills of young children at risk for literacy difficulties. In this study, we comprehensively assessed the early writing skills of 3- to 5.5-year old children ($n = 128$) to characterize the writing of young children identified as at-risk for later literacy difficulties and to compare the early writing skills of these children to their non-at risk peers. Results indicated that children who are considered at risk for later literacy difficulties lag behind their peers in a range of early writing skills, including name writing, letter writing, invented spelling, and story composition in preschool. Findings also suggest that early literacy screeners may identify children experiencing writing difficulties in addition to early reading challenges. Given the generally low writing ability of preschool-aged children, practical implications are discussed.

Keywords: writing skill, emergent literacy, early literacy difficulty

The Early Writing Skills of Children Identified as At-Risk for Literacy Difficulties

Early identification of children who struggle to develop reading skills—comprising over 30% of US children (The Nation’s Report Card, 2010)—is a valuable pursuit given that literacy difficulties begin prior to kindergarten entry (West, Denton, & Germino-Hausken, 2000) and impact academic success throughout school (Boscardin, Muthen, Francis, & Baker, 2008; Lonigan, Burgess, & Anthony, 2000; Senechal & LaFevre, 2002; Wagner et al., 1997; Vellutino, Scanlon, Small, & Fanuele, 2006). Children with literacy challenges are more likely to be referred to special education, suffer from expulsion or truancy, and drop out of school than their peers without these challenges (Gross & McChrystal, 2001; Keith & McCray, 2002). As adults, these children have reduced employment opportunities, increased health risks (Weiss, Hart, McGee, & D’Estelle, 1992), and are more likely to be involved with the criminal justice system (Bynner & Parsons, 1997; Keith & McCray, 2002). Fortunately, much is known about the early literacy skills of children identified as at-risk for literacy difficulties with respect to their letter knowledge, phonological awareness, and print concepts (Catts & Kamhi, 1999; Parrila, Kirby, & McQuarrie, 2004; Schatschneider, Carlson, Francis, Foorman, & Fletcher, 2002; Snow, Burns, & Griffin, 1998). Moreover, several early screeners and assessments are available to identify this risk (e.g., Get Ready To Read!-Revised, Whitehurst & Lonigan, 2010; EL-IGDIs, Early Literacy Early Childhood Research Institute on Measuring Growth and Development, 2000), as are recommendations for enhancing these skills (e.g., Fletcher-Campbell, Soler, Reid, 2009). Although early writing is also an important early literacy skill, related to later reading and writing achievement (Aram, 2005; Kim, Al Otaiba, & Wanzek, 2015; National Early Literacy Panel [NELP], 2008; Shatil, Share, & Levin, 2000), far less is known about the early writing skills of children identified as at-risk for literacy difficulties.

Understanding the early writing skills of children at risk for literacy challenges is important. In elementary grades, children who struggle with reading also struggle with writing, reflecting nearly 50% co-occurrence rates (Hooper, Roberts, Nelson, Zeisel, & Kasambria Fannin, 2010; Katusic, Colligan, Weaver, & Barbaresi, 2009) and writing challenges are the second most common reason for referral to school psychologists, after reading problems (Bramlett, Murphy, Johnson, Wallingsford, & Hall, 2002). Longitudinal work demonstrates considerable consistency of children's writing ability over time; early elementary difficulties in writing predict later writing difficulties (Abbott, Berninger, & Fayol, 2010). Thus, it is not surprising that nationally, 72% of fourth-grade students do not achieve the Proficient Level in writing examinations (National Center for Education Statistics [NCES], 2012) and these poor outcomes persist into 8th and 12th grades (NCES, 2002; NCES, 2012).

It may be that early identification of and intentional intervention for writing challenges could help to alleviate some of the poorer outcomes identified above. For reading skills, early identification and engagement in appropriate intervention enhance long-term outcomes (Torgesen, 2002) which often cannot be replicated with intervention efforts commencing in later grades (Francis, Shaywitz, Stuebing, Shaywitz, & Fletcher, 1996). However, the first step toward such action for early writing is to identify whether children who are at risk for later literacy difficulties also need supports for early writing. In addition, this understanding holds important practical implications, namely whether children who are identified as at-risk based on other literacy skills—those included on current screeners—would also need additional support in their writing development. Therefore, the purpose of this study is to examine the writing behaviors of children identified as at-risk for literacy difficulties and to compare these skills with those of children who are not identified as at-risk.

Early Writing Development

Early writing is an important early literacy skill and is related to later reading achievement in the short-term (NELP, 2008) and long-term (Hammill, 2004). In addition, children's writing at kindergarten entry predicts literacy skills such as decoding, spelling, and reading comprehension in first grade (Shatil et al., 2000), spelling in second grade (Aram, 2005), and writing in third grade (Kim et al., 2015). Research with preschool children documents the interrelations of children's early writing and early reading processes (e.g., Bloodgood, 1999; Diamond, Gerde, & Powell, 2008; Gerde, Skibbe, Bowles, & Martoccio, 2012; Morris, Bloodgood, & Perney, 2003). Studies reveal that children's writing is related to their letter knowledge (Bloodgood, 1999; Diamond et al., 2008; Justice, Invernizzi, Geller, Sullivan, & Welsch, 2005; Puranik, Lonigan, & Kim, 2011; Welsch, Sullivan, & Justice, 2003), word recognition (Bloodgood, 1999; Molfese et al., 2011), and phonological awareness (Blair & Savage, 2006; Diamond et al., 2008), perhaps because writing is an active way to engage children in using a range of literacy skills, thus developing these further. The act of writing fosters children's understanding of letter-sound correspondence, as children's knowledge of the alphabetic system grows (Read, 1975) while they engage in the process of segmenting and encoding sounds in words during their early writing (Bear, Invernizzi, Templeton, & Johnston, 2012; Clay, 2001; Read, 1975). In fact, children's ability to invent their spelling, that is, spell using the sounds children hear in words, is related to later reading outcomes (NELP, 2008; Ouellette & Sénéchal, 2008).

Typically developing young children begin to develop writing skills early. As young as two years of age, many children begin to understand that the marks they make represent meaning, and they use one or more forms of early writing (drawings, scribbles, and letter-like

forms) to record their ideas (Dinehart, 2015; Rowe & Neitzel, 2010). A body of work has demonstrated a typical progression through developmental phases of writing from drawing and scribbling to conventional spelling (Bloodgood, 1999; Hildreth, 1938; Liberman, 1985; Schickedanz & Casbergue, 2009; Sulzby & Teale, 1985). Names are often the first form of writing observed from children (Levin, Both-de Vries, Aram, & Bus, 2005; Treiman & Broderick, 1998) and most children (79%; Puranik & Lonigan, 2012) can write their name by the end of preschool. As children develop an understanding of the alphabetic principle (Bear et al., 2008), they begin to represent sounds in their writing; first they present initial or salient sounds and later they incorporate less salient sounds as they move toward conventional spelling (Puranik & Al Otaiba, 2012).

Writing Development for Children Identified as At-Risk

Although we know that even typically developing children can vary widely in their early writing skills (Diamond et al., 2008; Puranik & Lonigan, 2011; Welsch et al., 2003), we understand very little about the early writing skills of children identified as at-risk for literacy difficulties. Some research, however, focuses on the writing skills of young children with language impairment. Similar to typically developing children, children with specific language impairment (LI) vary widely in their name writing skill and reflect the range of scores from scribbling to accurate spelling of their name (Cabell, Justice, Zucker, & McGinty, 2009). Research by Cabell and colleagues (2009) found that when writing their names, 42% of preschool children with LI did not produce a single letter, 44% produced some but not all letters, and only 14% were able to write their names accurately. In addition, children's age was related to their writing skills; older children produced more sophisticated writing than younger children. Compared to typically developing peers, children with LI scored significantly lower in their

writing ability; reflecting a very large effect size ($d = 1.31$). In fact, children with LI included just 26.8% of the letters in their name compared to the 83.7% included by typically developing peers (Cabell et al., 2009). Clearly, children identified as at-risk due to LI exhibit comprehensive delays in their literacy skills including name writing as compared to their typically developing peers. Although this work initiated our understanding of the early writing of children with LI, the study focused exclusively on name writing, which is just one of several early writing skills.

Work by Puranik and Lonigan (2012) expanded this research to examine the name writing, letter writing, and spelling of children with LI and their typically developing peers. Results indicated that children with LI scored lower than their typically developing peers in all measures of early writing. Specifically, children with LI were less proficient in name writing, wrote and named significantly fewer letters, and demonstrated poorer spelling abilities than their typically developing peers. This same study found that children with nonverbal cognitive difficulties performed lower than children with stronger nonverbal cognitive abilities on these early writing tasks; however, oral language difficulties moderated this effect. That is, children with low IQ did not differ significantly from typically developing children in writing unless they also had LI (Puranik & Lonigan, 2012). For children with LI, their difficulties with language are not limited to reading (Boudreau & Hedberg, 1999; Catts, 1993; Spira, Bracken, & Fischel, 2005) but exist for writing as well. Yet, although it is clear that children at risk due to LI struggle with writing, the writing skills of children at risk for literacy difficulties more generally remains unknown.

Current Study

The theoretical framework informing this study recognizes that writing is comprised of related, yet distinct, component skills: conceptual knowledge, procedural knowledge, and

generative knowledge (Puranik & Lonigan, 2014). Conceptual knowledge includes a child's understanding of concepts related to print, a valuable early literacy skill (Justice & Piasta, 2011; NELP, 2008), and writing (e.g., linearity, directionality). Procedural knowledge, reflecting transcription skills (e.g., Berninger & Chanquoy, 2012) includes both mechanics (i.e., letter formation) and orthography, or spelling, which includes the ability to identify and write the sounds in words (Bear et al., 2012). Generative knowledge (Puranik & Lonigan, 2014) or composing, captures how children generate ideas for what to write (Berninger & Swanson, 1994; Graves, 2003; Kaderavek, Cabell, & Justice, 2009). Using this comprehensive framework, the present study captures several writing tasks from children identified as at-risk for literacy difficulties as well as those considered typically developing to assess skills within each of these knowledge areas, providing a more thorough examination of writing than previous research. Thus, the current study includes two research aims: (1) To characterize the early writing skills of children identified as at-risk for later reading difficulties and (2) To compare the early writing skills of these children to their peers who are not identified as at-risk. We expect the writing of children at risk for literacy difficulties to vary and to reflect lower skills than the typically developing children in each of the writing tasks examined.

Method

Participants

We utilized data from all children participating in the first cohort of a larger project ($n = 128$). The larger project was conducted in one midwestern state and investigated the efficacy of an emergent literacy intervention. Data for the current study were collected in the fall of the preschool year, prior to intervention start. We first recruited classrooms and teachers and then distributed caregiver consent materials to all children enrolled in participating classrooms. Up to

eight children who met eligibility criteria (i.e., caregiver consent, proficient in speaking and understanding English, free of significant medical/developmental disabilities) were selected per classroom and enrolled in the study. Children were selected into the study such that approximately half ($n = 62$) were considered to be at risk for later literacy difficulties, based on the emergent literacy screener described subsequently, and half were typically developing peers ($n = 66$). Notably, children selected into these samples were enrolled in the same set of participating classrooms.

At study entry, children were between the ages of 3 and 5.5 years ($M = 4.18$, $SD = 0.51$). Forty-two percent were male. Forty-six percent of children were Black/African American; 29% were White/Caucasian, 2% were Asian, 10% were multiracial, and 4% were of other racial backgrounds (9% unreported). Eleven percent were Hispanic/Latinx (8% unreported). Almost half (46%) of participating children came from families with annual household incomes of \$25,000 or less, whereas 34% came from families with annual household incomes between \$25,001 - \$75,000 and 12% from families with incomes of \$75,001 or more (8% unreported). Maternal education levels included less than high school diploma (9%), high school diploma or GED (17%), high school diploma or GED plus a technical training certificate (15%), some college but no degree (31%), Associate's degree (9%), Bachelor's degree (13%), or graduate degree (6%; 4% unreported). Table 1 presents demographic information for children identified as at-risk and their typically developing peers.

Procedures and Measures

After children were enrolled in the project, trained assessors from a local early learning initiative completed a literacy screener one-on-one with children in their respective preschool centers. This screener, detailed below, was used to identify children considered at risk for later

literacy difficulties. Then, trained research assistants worked individually with children to complete an assessment battery comprised of multiple measures of emergent literacy skills; this battery included a comprehensive measure of early writing.

Risk status. Children were identified as at-risk for later literacy difficulties using the Get Ready to Read!-Revised (GRTR-R) early literacy screener (Whitehurst & Lonigan, 2010; see also Lonigan & Wilson, 2008, Wilson & Lonigan, 2009). The GRTR-R is a quick, 10-minute assessment of children's print knowledge and phonological awareness that is well-established in the literature (Farrington & Lonigan, 2015; Lonigan, Allan, & Lerner, 2011; Wilson & Lonigan, 2009). Administering the GRTR-R involves showing the child a set of four pictures and asking them to point to the picture that correctly answers a question (e.g. "These pictures are: mouse, cloud, cow, moon. Find what you get when you put /m/ and /oon/ together"). Children are asked 25 questions for which they can receive either a 0 (incorrect) or 1 (correct). Correct answers are summed into a single score. This score is compared to a classification chart based on the child's age, which has been shown to accurately identify children at risk for later reading difficulties (Farrington & Lonigan, 2015; Wilson & Lonigan, 2009). Psychometric properties of the GRTR-R support its internal consistency and test-retest reliability ($\alpha = .86-.96$ and $r = .81-.89$, respectively; see Phillips, Lonigan, & Wyatt, 2009; Missall & McConnell, 2004; Molfese, Molfese, Walker, & Neamon, 2004), as well as its validity (e.g., concurrent validity of .59-.77 with Individual Growth and Development Indicators of Early Literacy tasks).

Writing skills. Children's writing skills were comprehensively assessed across several writing tasks. Children were provided blank pieces of paper and a marker and prompted to write (a) their name, (b) ten predetermined commonly known letters (i.e., T, B, H, M, S, A, D, J, C and P), and (c) five consonant-vowel-consonant (CVC) words adapted from Invernizzi, Meier,

Swank, and Juel (1997). The CVC words were selected to include each vowel and non-repeating consonants (i.e., sad, hug, lip, net, and job). Next, children completed a basic story composition task. Specifically, children were given two pictures of a mother and baby raccoon and asked to write what they thought was happening in each of the pictures and then “read” their written response back to the assessor. Research assistants recorded both children’s verbal and written responses. All writing data were scored at the research lab by research assistants who were trained to reliability standards, as described below.

We scored children’s emergent writing by applying previous coding schemes to measures of name writing, letter writing, and invented spelling (i.e., Diamond et al., 2008; Gerde, Bingham, & Pendergast, 2015; Invernizzi et al., 1997) with some slight adaptations (e.g., combining scribbling and drawing into a single category). As demonstrated in this past work, these coding schemes can be used to reliably and validly assess children’s writing skills from the types of writing samples described above. Children’s *name writing* was scored on an ordinal scale of 0 = refusal/no response, 1 = scribbling/drawing, 2 = use of letter-like shapes, 3 = use of at least one letter, or 4 = name spelled entirely correctly. Children’s *name writing* was also scored for whether they used appropriate capitalization (0 = not correctly capitalized, 1 = correctly capitalized), wrote with appropriate directionality (written from left to right; 0 = no, 1 = yes), and wrote horizontally across the paper (i.e., less than 45 degrees in curvature on the page; 0 = not horizontal, 1 = horizontal). *Letter writing* was coded similarly to *name writing*, such that 0 = refusal/no response, 1 = scribbling/drawing, 2 = letter-like shape, 3 = a letter other than the letter dictated to the child, or 4 = correct letter. We considered scores for the ten individual letters descriptively but also calculated a composite *letter writing* score for our comparative analysis, averaging across all ten letters ($\alpha = .76$).

For *invented spelling*, we coded children's responses to the five CVC words. These were coded as 0 = refusal/no response, 1 = scribbling/drawing, 2 = use of letters or letter-like shapes, 3 = use of a letter to represent an initial or salient sound, 4 = use of letters to represent multiple sounds in the word, or 5 = word spelled correctly. We considered invented spelling scores for each individual CVC word descriptively but also calculated a composite *invented spelling* score for each child for our comparative analysis, averaging across all five words ($\alpha = .82$).

For *story composition*, we coded children's responses to this task with respect to the association between their written and verbal responses and the complexity of their written responses. Both verbal/written association and word complexity are aspects of children's composing that demonstrate their ability to choose which words to use in addition to their understanding of writing as a form of communication (Berninger, 2009; Rowe & Wilson, 2015). Association scores were coded as 0 = refusal/no response (i.e., neither a verbal nor written response), 1 = verbal and written response were not related to one another (e.g. a verbal response of "Mommy Raccoon" and written response "the"), or 2 = verbal and written response were related (e.g. a verbal response of "Mommy Raccoon" and written response "Mama RAKN"). For story complexity, we counted the total number of letters and words written, including partial words and children's invented spelling.

Two research assistants were trained to use the above coding system using sample packets containing examples of children's emergent name writing, letter writing, invented spelling, and composition. Coders initially read the coding manual and completed three rounds of practice scoring followed by debriefing meetings with the master coder. Next, coders scored three sets of five master-coded writing sample packets for a total of 15 writing sample packets. Coders continued scoring until they achieved 90% agreement with master codes across three sets

of writing sample packets. Research assistants double-coded a randomly selected 20% of all writing samples to ascertain ongoing interrater reliability; kappa ranged from .74-1.00 at the item level.

Results

Writing Skills of Children Identified as At-Risk for Later Literacy Difficulties

To address our first research aim, we considered only those children identified as at-risk for later literacy difficulties and examined descriptive statistics such as minimum and maximum scores as compared to the range of possible scores, means, standard deviations, and frequencies for our measures of name writing, letter writing, invented spelling, and story composition. Results are presented in Table 2 along with the Figures. Children identified as at-risk for later literacy difficulties averaged 2.22 on the name writing task, corresponding to use of letter-like shapes. Figure 1 depicts the range of their name writing skills, showing that 29% used scribbling/drawing, 23% used letter-like shapes, 45% used letters, and 3% wrote their names accurately. Most (92%) did not capitalize the first letter of their names. Approximately 40% wrote their names from left to right (directionality), and 42% wrote their names horizontally across the page. For letter writing and invented spelling, children identified as at-risk typically used drawing and/or scribbling ($M = 1.56$ and 1.18 , respectively). As depicted in Figure 2, for letter writing, 57% of children used drawing and/or scribbling, 36% used letter-like shapes, and the remaining 7% wrote a letter other than the one dictated to them (e.g. wrote the letter “r” when asked to write “b”). For invented spelling (Figure 3), the majority of children identified as at-risk used drawing and/or scribbling (82%) and only a few used letter-like shapes (14%). For story composition, children identified as at-risk typically did not provide a verbal response that matched their written response ($M = .98$); only 5% of children responded in a way that

demonstrated an association between these responses. Written responses generally exhibited low complexity (e.g., a child non-directionally scribbles to represent the word “raccoon”). Nearly 80% of children used fewer than one letter ($M = 0.63$) in their responses, with five being the most letters used in a child’s response (see Figure 4). No child identified as at-risk for later literacy difficulties wrote a complete word in their response to the composition task.

Writing Abilities of Children Identified as At-Risk Compared to Their Non-At Risk Peers

Prior to addressing our second research aim, we first conducted preliminary analyses to examine levels of shared classroom variance and to compare the two groups of children on demographic characteristics. First, given that children were nested in classrooms, we checked whether multilevel modeling would be necessary for analyses. We estimated unconditional hierarchical linear models, or one-way random effect analysis of variance models, for each outcome of interest and computed the intraclass correlation coefficients (ICCs) for each outcome. ICCs ranged from .01 to .07, indicating that the total variation in outcomes due to shared classrooms was minimal (i.e., less than 7% for all writing outcomes). In part, this may be due to the fact that data were collected upon the start of the preschool year. Second, we compared children identified as at-risk for later literacy difficulties to their typically developing peers on the demographic characteristics presented in Table 1. There were no significant group differences with respect to age [$t(123) = -.420, p = .675$], gender [$\chi^2(7, N = 130) = 7.11, p = .571$], race [$\chi^2(4, N = 130) = 3.81, p = .433$], ethnicity [$\chi^2(1, N = 130) = 1.294, p = .394$], or maternal education level [$t(123) = -1.51, p = .13$]. The groups did differ on annual household income [$t(118) = -3.12, p = .002$]; commensurate with prior work (e.g., Reardon, 2013; Strang & Piasta, 2016), families of children who were identified as at-risk for later literacy difficulties tended to be from lower income levels.

To address our second research aim, we conducted independent *t*-tests and chi-squared tests of significance to compare the name writing, letter writing, invented spelling, and story composition skills of children identified as at-risk for later literacy difficulties to their peers at the beginning of the preschool year (see Table 2). Note that, for letter writing and invented spelling, we conducted comparative analyses on the composite scores only, rather than each individual letter or word. Children identified as at-risk for later literacy difficulties generally exhibited less sophisticated name writing skills than their non-at risk peers. Their overall name writing score was lower [$t(128) = -2.41, p = .028$], with their peers more likely to use discernable letters when writing their names. Although they did not differ from their peers in their use of capitalization [$\chi^2(1, N = 130) = .32, p = .571$], children identified as at-risk were also less likely to exhibit left-to-right directionality when writing [$\chi^2(1, N = 129) = 6.6, p = .01$] and less likely to write horizontally across the page [$\chi^2(1, N = 129) = 6.56, p = .01$] than their peers. Similarly, children identified as at-risk scored significantly lower than their peers on both letter writing and invented spelling [$t(100.95) = -5.39, p = .001$ and $t(87.10) = -3.10, p = .003$, respectively]. In both cases, peers more often used letters or letter-like shapes. For story composition, children identified as at-risk were significantly less likely to exhibit an association between their written and verbal responses [$\chi^2(2, n = 130) = 6.96, p = .031$], with 5% and 18% of children at risk and peers, respectively, providing a verbal response that aligned with what they had written. Children identified as at-risk also used significantly fewer letters in their compositions [$t(111.20) = -2.56, p = .012$]. Children did not differ in the number of words written in story composition [$t(64) = -1.65, p = .10$], likely because the vast majority (67%) did not write any words. The less developed writing skills of children identified as at-risk for later literacy difficulties were also

apparent from examining histograms of their responses compared to their peers, as depicted in Figures 1, 2, 3, and 4.

Discussion

This study contributes to the field in several important ways. To our knowledge, this is the first study to describe the writing of young children at risk for literacy difficulties utilizing a comprehensive assessment of writing. Our comparative analyses illuminate the gap that exists for these vulnerable children in comparison to their typically developing peers, demonstrating a critical opportunity to intervene. In addition, the work holds practical implications for writing instruction and the use of early literacy screeners.

Early Writing of Children At Risk for Literacy

Our first major finding was that children who are considered at risk for later literacy difficulties, as identified by a widely used literacy screener, lag behind their peers in several early writing skills at the beginning of the preschool year; they score lower in name writing, letter writing, invented spelling, and story composition. Children considered at risk typically used drawing, scribble writing, and letter-like shapes, whereas their peers used more letter-like formations or actual letters when prompted to write their names, individual letters, or CVC words. This finding is important in light of research demonstrating that children's early name writing and invented spelling skills are related to later reading and spelling outcomes (Aram, 2005; Kim et al., 2015; NELP, 2008; Ouellette & Sénéchal, 2008). Moreover, the results are concerning given that there is a strong consistency in children's writing from kindergarten entry through fourth grade; children who enter kindergarten with less developed writing skills tend to struggle with writing well into elementary school (Abbott et al., 2010). Similarly, young children who are at risk for literacy difficulties tend to struggle with emergent literacy skills such as

phonological awareness and alphabet knowledge, and continue to struggle with such skills necessary for reading success as they matriculate into elementary grades (as supported by Parrila et al., 2004; Schatschneider et al., 2002; Snow et al., 1998). Given that early writing is related to emergent literacy skills such as letter knowledge (Diamond et al., 2008; Justice et al., 2005; Puranik et al., 2011; Welsch et al., 2003), letter-sound knowledge (Blair & Savage, 2006), and word recognition (Bloodgood, 1999; Molfese et al., 2011), it is not surprising that children who struggle with these literacy skills also struggle with writing.

Although not surprising, these findings demand attention because early struggles for vulnerable children result in long-term challenges (Abbott et al., 2010). Whereas previous work has examined the early writing skills of vulnerable children such as those with LI (Cabell et al., 2009; Puranik & Lonigan, 2012) and the name writing skills of those specifically living in poverty (Diamond et al., 2008), this work identified similar vulnerability for a broader population of children identified as at-risk for literacy difficulties. It is important to note that children in the sample who were identified as at-risk for later literacy difficulties included those from lower income families (55%) to a greater extent than those identified as peers. Although this group difference may indicate that children identified as at-risk for later literacy difficulties have less access to resources outside of the classroom (e.g. books, writing materials) and thus less opportunities to develop early writing skills, there was no group difference in maternal education levels, which is another commonly used proxy for socioeconomic status (e.g., Connor, Morrison, & Slominski, 2006; Piasta, Justice, McGinty, & Kaderavek, 2012; Skibbe, Justice, Zucker, & McGinty, 2008). The fact that children identified as at-risk for literacy difficulties tended to be from lower income families aligns with past research demonstrating associations between children's emergent literacy skills and family income (e.g., Lonigan, Purpura, Wilson,

Walker, & Clancy-Menchetti, 2013) and is a reminder of the important role that socioeconomic status may play in children's development. Thus, our work here expands what is currently known about the writing of children identified as at-risk, including those from low income households, in showing that these children demonstrate lower writing skills on a wide range of early writing assessments including name, letter, word, and story writing.

One important innovation of this work is that we approached this study with a comprehensive framework of early writing that included children's conceptual, procedural, and generative knowledge about writing (Puranik & Lonigan, 2014). This framework informed our utilization of a writing measure that assessed all aspects of children's writing including name writing, letter writing, invented spelling, and story composition. Past work has typically assessed only one or a few of these skills, particularly name writing and/or letter writing (e.g., Cabell et al., 2009; Diamond et al., 2008; Gerde et al., 2012; Puranik & Lonigan, 2012). Using a more comprehensive measure of children's writing, such as that utilized in this study, is valuable in assessing children's writing skills beyond that of procedural knowledge (Quinn & Bingham, in press). The data presented here capture—in addition to spelling—children's idea generation as well as children's understanding of the connection between verbal and written communication (see Rowe & Wilson, 2015), providing a far more complete depiction of children's writing than previous work. Comprehending the full scope of writing for children at risk contributes to our broad knowledge of early writing development and helps in the pursuit to detect later challenges in these critical skills.

Screening for Writing Difficulties

Our second major finding was that young children identified as at-risk for literacy difficulties on a widely used screener, the GRTR-R, also demonstrated lower writing ability

compared to children not identified as at-risk. This finding is particularly notable given that, although GRTR-R screens for later literacy difficulties, it does not include items that directly assess early writing. This indicates that early literacy screeners that focus on print knowledge and phonological awareness may also help identify children likely to struggle with writing. Future work should empirically examine whether established screeners, such as the GRTR-R, can validly and reliably identify children who later experience writing difficulties in order to initiate early writing intervention and, in turn, reduce poor outcomes in writing identified in fourth, eighth, and twelfth grades (National Center for Education Statistics, 2012).

Assessing early literacy risk can help practitioners make informed instructional decisions to better support foundational reading and writing skills. Using an already established screener to identify both early literacy and early writing is of benefit to practitioners for two reasons. For one, given numerous demands on early childhood teachers' time, this would eliminate the need to use multiple screeners to identify children struggling with both early reading and writing. Second, simultaneous detection of reading and writing challenges would allow early childhood teachers to plan appropriate instruction such that early writing skills can be supported alongside early reading, as both are required for children's literacy success.

General Need for Early Writing Opportunities

Our third major finding concerned the name writing, letter writing, and composing ability of both groups of children. On average, preschool-age children with identified risk as well as their typically developing peers have little name and letter writing ability. This finding may reflect that parents are less likely than teachers to recognize early forms of writing (Hall, White, Guo, & Emerson, 2017) and generally provide few supports for early writing (Aram, Bazelet, & Goldman, 2010; Aram & Levin, 2011). It is clear that children experience fewer home

opportunities to support their early writing skills versus reading skills prior to preschool entry, making writing instruction opportunities in the classroom even more important. Unfortunately, a growing body of research demonstrates that writing is rarely supported in early childhood classrooms (Bingham, Quinn, & Gerde, 2017; Gerde, Bingham, & Pendergast, 2015) and far less instructional time is devoted to writing compared to reading (Puranik, Al Otaiba, Sidler, & Greulich, 2013).

Fortunately, there are a number of ways teachers can support children's writing in early childhood classrooms. Writers workshop can be integrated into preschool settings in ways that promote a balance of teachers sharing content information about writing (e.g., that text can be read, use of capital vs. lower case, genre comparison) and open opportunities to use this new information in play (King, 2012). Teachers can provide opportunities for children to engage in the writing process by explicitly modeling writing during activities such as morning message or by writing down children's thoughts to show how words can be translated into print (Gerde, Bingham, & Wasik, 2012). Explicit scaffolding of writing, such as asking children to sound out letters and words, assists in their procedural writing knowledge such as transcription skills of handwriting and spelling. In addition, teachers can offer more writing opportunities during literacy instruction, such as alphabet knowledge activities, to support children's writing and understanding of letters (Jones, Clark, & Reutzel, 2013). Importantly, intervention work has found writing interventions to effectively enhance children's writing skills (Aram & Biron, 2004; Hall, Simpson, Guo, & Wang, 2015; Hall, Toland, Grisham-Brown, & Graham, 2014; Hofslundsengen, Hagtyet, & Gustafsson, 2016).

In particular, our findings highlight the need to provide more opportunities for composing in early childhood classrooms. Regardless of risk status, all children struggled to verbally

describe what they wrote on the page for story composition; most verbal and written responses did not correlate (e.g. a child wrote the letter “H” and verbally indicated that he wrote “sad”). These findings demonstrate a lack of understanding in children’s conceptual knowledge and generative knowledge, both of which are key components of early writing (Puranik & Lonigan, 2014). That is, children struggled to understand the relation between their oral language and the print; the understanding that print carries meaning and that words can be captured in print is foundational to all writing tasks (Clay, 2001; Rowe & Wilson, 2015). This challenge to compose and recognize the oral language-print match likely reflects the lack of opportunity that children have to engage in composing experiences. Although previous work has indicated that teachers’ supports for composing (e.g., asking children to generate ideas, considering the relation between oral language and print) predict children’s name writing and invented spelling at the end of preschool, these types of support are rare in preschool classrooms (Bingham et al., 2017). This is an unfortunate missed opportunity because the purpose of writing is to communicate a message through print. Composing is a developmentally appropriate way to engage young children in writing because all young children have a message to share and composing allows children to draw on their individual interests and use the skills they have to communicate (Copple & Bredekamp, 2009; Gerde, Bingham, & Wasik, 2012). A growing body of literature recommends appropriate ways to engage children in writing tasks – not only to write letters, but to work with young children on composition and the function of writing to relay a message (Hart, Fitzpatrick, & Cortesa, 2010; Gerde, Bingham, & Wasik, 2012; Rowe, Fitch, & Bass, 2003). Composing skills can be supported through a range of authentic writing tasks in which children are afforded the opportunity to compose within a meaningful context (e.g. writing a grocery list, treasure map, restaurant menu; see Duke, Purcell-Gates, Hall, & Tower, 2006) including within children’s play

(Bingham, Quinn, McRoy, Zhang, & Gerde, 2018). Importantly, teachers can utilize a range of scaffolds to draw attention to the writing to support children's understanding that writing conveys meaning and that their work can be translated to print on paper (Quinn, Gerde, & Bingham, 2016).

Conclusion

In this work, we comprehensively examined the early writing of young children identified as at-risk for later literacy difficulties and found that these children tended to have less developed writing skills than their peers. Although this work cannot speak to mechanism or why these children tended to lag behind their peers in various early writing and composing skills, our findings call for attention to writing support for preschool-aged children, especially for those considered to be at risk for later literacy challenges, and suggest that existing early literacy screeners may help teachers identify these children such that early and appropriate writing opportunities can be offered.

References

- Abbott, R.D., Berninger, V.W., & Fayol, M. (2010). Longitudinal relationships of levels of language in writing and between writing and reading in grades 1 to 7. *Journal of Educational Psychology*, 102(2), 281–298.
- Aram D. (2005). Continuity in children's literacy achievements: A longitudinal perspective from kindergarten to school. *First Language*, 25, 259–289.
- Aram, D., Bazelet, I., & Goldman, H. (2010). Early literacy and parental writing mediation in young children with and without ADHD. *European Journal of Special Needs Education*, 25(4), 397-412.
- Aram, D., & Biron, S. (2004). Joint storybook reading and joint writing interventions among low SES preschoolers: Differential contributions to early literacy. *Early Childhood Research Quarterly*, 19(4), 588-610.
- Aram, D., & Levin, I. (2011). Home support of children in the writing process: Contributions to early literacy. *Handbook of Early Literacy*, 3, 189-199.
- Bear, D., Invernizzi, M., Templeton, S., & Johnston, F. (2012). *Words their way: Word study for phonics, spelling, and vocabulary instruction*. Upper Saddle River, NJ: Prentice-Hall.
- Berninger, V. W. (2009). Highlights of programmatic, interdisciplinary research on writing. *Learning Disabilities Research and Practice*, 24(2), 69-80.
- Berninger, V. W., & Chanquoy, L. (2012). What writing is and how it changes across early and middle childhood development. *Writing: A Mosaic of New Perspectives*, 65-84.
- Berninger, V. W., & Swanson, H. L. (1994). Modifying Hayes and Flower's model of skilled writing to explain beginning and developing writing. *Advances in cognition and educational practice*, 2, 57-81.

- Bingham, G. E., Quinn, M. F., & Gerde, H. K. (2017). Examining early childhood teachers' writing practices: Associations between pedagogical supports and children's writing skills. *Early Childhood Research Quarterly, 39*, 35-46.
- Bingham, G. E., Quinn, M. F., McRoy, K., Zhang, X., & Gerde, H. K. (2018). Integrating Writing into the Early Childhood Curriculum: A Frame for Intentional and Meaningful Writing Experiences. *Early Childhood Education Journal, 1*-11.
- Blair, R., & Savage, R. (2006). Name writing but not environmental print recognition is related to letter-sound knowledge and phonological awareness in pre-readers. *Reading and Writing, 19*(9), 991-1016.
- Bloodgood, J. W. (1999). What's in a name? Children's name writing and literacy acquisition. *Reading Research Quarterly, 34*(3), 342-367.
- Boscardin C, Muthén B, Francis D, Baker E. (2008). Early identification of reading difficulties using heterogeneous developmental trajectories. *Journal of Educational Psychology, 100*, 192–208.
- Boudreau, D. M., & Hedberg, N. L. (1999). A comparison of early literacy skills in children with specific language impairment and their typically developing peers. *American Journal of Speech-Language Pathology, 8*(3), 249-260.
- Bramlett, R. K., Murphy, J. J., Johnson, J., Wallingsford, L., & Hall, J. D. (2002). Contemporary practices in school psychology: A national survey of roles and referral problems. *Psychology in the Schools, 39*(3), 327-335.
- Bynner, J. & Parsons, S. (1997). It doesn't get any better: The impact of poor basic skills on the lives of 37-year-olds. London: The Basic Skills Agency.
- Cabell, S. Q., Justice, L. M., Zucker, T. A., & McGinty, A. S. (2009). Emergent name-writing

- abilities of preschool-age children with language impairment. *Language, Speech, and Hearing Services in Schools*, 40(1), 53-66.
- Catts, H. W., & Kamhi, A. G. (1999). *Language and learning disabilities*. London: Allyn & Bacon.
- Clay, M. M. (2001). *Change over time in children's literacy development*. Heinemann Educational Books.
- Connor, C. M., Morrison, F. J., & Slominski, L. (2006). Preschool instruction and children's emergent literacy growth. *Journal of Educational Psychology*, 98(4), 665.
- Copple, C., & Bredekamp, S. (2009). *Developmentally appropriate practice in early childhood programs serving children from birth through age 8*. National Association for the Education of Young Children. Washington, DC.
- Diamond, K. E., Gerde, H. K., & Powell, D. R. (2008). Development in early literacy skills during the pre-kindergarten year in Head Start: Relations between growth in children's writing and understanding of letters. *Early Childhood Research Quarterly*, 23(4), 467-478.
- Dinehart, L. H. (2015). Handwriting in early childhood education: Current research and future implications. *Journal of Early Childhood Literacy*, 15(1), 97-118.
- Duke, N. K., Purcell-Gates, V., Hall, L. A., & Tower, C. (2006). Authentic literacy activities for developing comprehension and writing. *The Reading Teacher*, 60(4), 344-355.
- Early Childhood Research Institute on Measuring Growth and Development. (2000). *Individual growth and development indicators for preschool children*. Minneapolis, MN: Center for Early Education and Development, University of Minnesota.
- Farrington, A. L., & Lonigan, C. J. (2015). Examining the measurement precision and invariance

- of the revised get ready to read!. *Journal of Learning Disabilities*, 48(3), 227-238.
- Fletcher-Campbell, F., Soler, J., & Reid, G. (Eds.). (2009). Approaching difficulties in literacy development: Assessment, pedagogy and programmes. Sage.
- Francis, D. J., Shaywitz, S. E., Stuebing, K. K., Shaywitz, B. A., & Fletcher, J. M. (1996). Developmental lag versus deficit models of reading disability: A longitudinal, individual growth curves analysis. *Journal of Educational Psychology*, 88, 3–17.
- Gerde, H. K., Bingham, G. E., & Pendergast, M. L. (2015). Reliability and validity of the Writing Resources and Interactions in Teaching Environments (WRITE) for preschool classrooms. *Early Childhood Research Quarterly*, 31, 34-46.
- Gerde, H. K., Bingham, G. E., & Wasik, B. A. (2012). Writing in early childhood classrooms: Guidance for best practices. *Early Childhood Education Journal*, 40(6), 351-359.
- Gerde, H. K., Skibbe, L. E., Bowles, R. P., & Martoccio, T. L. (2012). Child and home predictors of children's name writing. *Child Development Research*, 2012.
- Graves, D. H. (2003). *Writing: Teachers and children at work* (20th anniversary ed.). Portsmouth, NH: Heinemann.
- Gross, J. & McChrystal, M.A. (2001). The protection of a statement? Permanent exclusions and the SEN code of practice. *Educational Psychology in Practice*, 17(4), 347-359.
- Hall, A. H., White, K. M., Guo, Y., & Emerson, A. (2017). Who counts as a writer? Examining child, teacher, and parent perceptions of writing. *Early Child Development and Care*, 1-23.
- Hall, A. H., Simpson, A., Guo, Y., & Wang, S. (2015). Examining the effects of preschool writing instruction on emergent literacy skills: A systematic review of the literature. *Literacy Research and Instruction*, 54(2), 115-134.

- Hall, A. H., Toland, M. D., Grisham-Brown, J., & Graham, S. (2014). Exploring interactive writing as an effective practice for increasing Head Start students' alphabet knowledge skills. *Early Childhood Education Journal*, 42(6), 423-430.
- Hammill, D. D. (2004). What we know about correlates of reading. *Exceptional Children*, 70(4), 453-469.
- Hildreth, G. (1938). The educational achievement of gifted children. *Child Development*, 365-371.
- Hofslundsengen, H., Hagtvet, B. E., & Gustafsson, J. E. (2016). Immediate and delayed effects of invented writing intervention in preschool. *Reading and Writing*, 29(7), 1473-1495.
- Hooper, S. R., Roberts, J., Nelson, L., Zeisel, S., & Kasambira Fannin, D. (2010). Preschool predictors of narrative writing skills in elementary school children. *School Psychology Quarterly*, 25, 1-12.
- Invernizzi, M., Meier, J., Swank, L., & Juel, C. (1997). *Phonological Awareness Literacy Screening-Kindergarten*. Charlottesville, VA: University Printing.
- Jones, C. D., Clark, S. K., & Reutzel, D. R. (2013). Enhancing alphabet knowledge instruction: Research implications and practical strategies for early childhood educators. *Early Childhood Education Journal*, 41(2), 81-89.
- Justice, L. M., Invernizzi, M., Geller, K., Sullivan, A. K., & Welsch, J. (2005). Descriptive developmental performance of at-risk preschoolers on early literacy tasks. *Reading Psychology*, 26(1), 1-25.
- Justice, L. M., & Piasta, S. B. (2011). Developing children's print knowledge through adult-child storybook reading interactions: Print referencing as an instructional practice. *Handbook of Early Literacy Research*, 3, 200-213.

- Kaderavek, J. N., Cabell, S. Q., & Justice, L. M. (2009). Early writing and spelling development. *Emergent Literacy and Language Development: Promoting Learning in Early Childhood*, 104-152.
- Katusic, S. K., Colligan, R. C., Weaver, A. L., & Barbaresi, W. J. (2009). The forgotten learning disability: Epidemiology of written-language disorder in a population-based birth cohort (1976–1982). *Pediatrics*, 123(5), 1306–1313.
- Keith, J., & McCray, A. (2002). Juvenile offenders with special needs: Critical issues and bleak outcomes. *Qualitative Studies in Education*, 15, 691–710.
- Kim, Y. S., Al Otaiba, S., & Wanzek, J. (2015). Kindergarten predictors of third grade writing. *Learning and Individual Differences*, 37, 27–37.
- King, K. A. (2012). Writing Workshop In Preschool: Acknowledging Young Children as Writers. *The Reading Teacher*, 65(6), 392-401.
- Levin, I., Both–De Vries, A., Aram, D., & Bus, A. (2005). Writing starts with own name writing: From scribbling to conventional spelling in Israeli and Dutch children. *Applied Psycholinguistics*, 26(3), 463-477.
- Lonigan, C. J., Allan, N. P., & Lerner, M. D. (2011). Assessment of preschool early literacy skills: Linking children's educational needs with empirically supported instructional activities. *Psychology in the Schools*, 48(5), 488-501.
- Lonigan, C. J., Burgess, S. R., & Anthony, J. L. (2000). Development of emergent literacy and early reading skills in preschool children: Evidence from a latent-variable longitudinal study. *Developmental Psychology*, 36, 596-613.
- Lonigan, C. J., Purpura, D. J., Wilson, S. B., Walker, P. M., & Clancy-Menchetti, J. (2013).

- Evaluating the components of an emergent literacy intervention for preschool children at risk for reading difficulties. *Journal of Experimental Child Psychology*, 114(1), 111-130.
- Lonigan, C. J., & Wilson, S. B. (2008). *Report on the Revised Get Ready to Read! Screening tool: Psychometrics and normative information* (Tech. Rep.). New York, NY: National Center for Learning Disabilities.
- Missall, K. N., & McConnell, S. R. (2004). *Psychometric characteristics of individual growth and development indicators: Picture naming, rhyming, and alliteration* (Tech. Report No. 8). Minneapolis, MN: Center for Early Education and Development.
- Molfese, V. J., Beswick, J. L., Jacobi-Vessels, J. L., Armstrong, N. E., Culver, B. L., White, J.M., & Molfese, D. L. (2011). Evidence of alphabetic knowledge in writing: Connections to letter and word identification skills in preschool and kindergarten. *Reading and Writing*, 24(2), 133-150.
- Molfese, V. J., Molfese, D. L., Modglin, A. T., Walker, J., & Neamon, J. (2004). Screening early reading skills in preschool children: Get Ready to Read. *Journal of Psychoeducational Assessment*, 22(2), 136-150.
- Morris, D., Bloodgood, J., & Perney, J. (2003). Kindergarten predictors of first-and second-grade reading achievement. *The Elementary School Journal*, 104(2), 93-109.
- National Center for Education Statistics. (2002). The nation's report card: Writing 2002. Washington, D. C.: Institute of Education Sciences, U.S. Department of Education.
- National Center for Education Statistics. (2010). The nation's report card: Reading 2009. Washington: DC: Institute of Education Sciences, U.S. Department of Education.
- National Center for Education Statistics. (2012). The nation's report card: Writing 2011. Washington, DC: Institute of Education Sciences, U.S. Department of Education.

National Early Literacy Panel. (2008). *Developing early literacy*. Washington, D. C.: National Institute for Literacy.

Ouellette, G., & Sénéchal, M. (2008). Pathways to literacy: A study of invented spelling and its role in learning to read. *Child Development*, 79(4), 899-913.

Parrila, R., Kirby, J. R., & McQuarrie, L. (2004). Articulation rate, naming speed, verbal short term memory, and phonological awareness: Longitudinal predictors of early reading development? *Scientific Studies of Reading*, 8, 3–26.

Phillips, B. M., Lonigan, C. J., & Wyatt, M. A. (2009). Predictive validity of the Get Ready to Read! screener: Concurrent and long-term relations with reading-related skills. *Journal of Learning Disabilities*, 42(2), 133-147.

Piasta, S. B., Justice, L. M., McGinty, A. S., & Kaderavek, J. N. (2012). Increasing young children's contact with print during shared reading: Longitudinal effects on literacy achievement. *Child Development*, 83(3), 810-820.

Puranik, C., & Al Otaiba, S. (2012). Examining the contribution of handwriting and spelling to written expression in kindergarten children. *Reading and Writing*, 25, 1523–1546.

Puranik, C. S., Al Otaiba, S., Sidler, J. F., & Greulich, L. (2014). Exploring the amount and type of writing instruction during language arts instruction in kindergarten classrooms. *Reading and Writing*, 27(2), 213-236.

Puranik, C. S., & Lonigan, C. J. (2012). Early writing deficits in preschoolers with oral language difficulties. *Journal of Learning Disabilities*, 45(2), 179-190.

Puranik, C. S., & Lonigan, C. J. (2012). Name-writing proficiency, not length of name, is associated with preschool children's emergent literacy skills. *Early Childhood Research Quarterly*, 27(2), 284-294.

- Puranik, C. S., & Lonigan, C. J. (2014). Emergent writing in preschoolers: Preliminary evidence for a theoretical framework. *Reading Research Quarterly*, 49(4), 453-467.
- Puranik, C. S., Lonigan, C. J., & Kim, Y. S. (2011). Contributions of emergent literacy skills to name writing, letter writing, and spelling in preschool children. *Early Childhood Research Quarterly*, 26(4), 465-474.
- Quinn, M. F., Gerde, H. K., & Bingham, G. E. (2016). Help me where I am: Scaffolding writing in preschool classrooms. *The Reading Teacher*, 70(3), 353-357.
- Read, C. (1975). *Children's categorization of speech sounds in English* (No. 17). National Council of Teachers of English.
- Rowe, D. W., Fitch, J. D., & Bass, A. S. (2003). Toy stories as opportunities for imagination and reflection in writer's workshop. *Language Arts*, 80(5), 363.
- Rowe, D. W., & Neitzel, C. (2010). Interest and agency in 2-and 3-year-olds' participation in emergent writing. *Reading Research Quarterly*, 45(2), 169-195.
- Rowe, D. W., & Wilson, S. J. (2015). The development of a descriptive measure of early childhood writing: Results from the Write Start! writing assessment. *Journal of Literacy Research*, 47(2), 245-292.
- Schatschneider, C., Carlson, C. D., Francis, D. J., Foorman, B., & Fletcher, J. (2002). Relationships of rapid automatized naming and phonological awareness in early reading development: Implications for the double deficit hypothesis. *Journal of Learning Disabilities*, 35, 245-256.
- Schickedanz, J., & Casbergue, R. (2009). *Writing in preschool: Learning to orchestrate meaning and marks* (2nd ed.). Newark, DE: International Reading Association.
- Sénéchal, M., & LeFevre, J. (2002). Parental involvement in the development of children's

- reading skill: A five-year longitudinal study. *Child Development*, 73, 445–460.
- Shatil, E., Share, D., & Levin, I. (2000). On the contribution of kindergarten writing to grade, 1 literacy: A longitudinal study in Hebrew. *Applied Psycholinguistics*, 21, 1–21.
- Skibbe, L. E., Justice, L. M., Zucker, T. A., & McGinty, A. S. (2008). Relations among maternal literacy beliefs, home literacy practices, and the emergent literacy skills of preschoolers with specific language impairment. *Early Education and Development*, 19(1), 68-88.
- Snow, C. E., Burns, M. S. and Griffin, P., (Eds.). (1998). *Preventing reading difficulties in young children*. Washington, DC: National Academy Press.
- Spira, E. G., Bracken, S. S., & Fischel, J. E. (2005). Predicting improvement after first-grade reading difficulties: the effects of oral language, emergent literacy, and behavior skills. *Developmental Psychology*, 41(1), 225.
- Sulzby, E., & Teale, W. H. (1985). Writing development in early childhood. *Educational Horizons*, 64(1), 8-12.
- Torgesen, J. K. (2002). The prevention of reading difficulties. *Journal of School Psychology*, 40, 7-26.
- Treiman, R., & Broderick, V. (1998). What's in a name: Children's knowledge about the letters in their own names. *Journal of Experimental Child Psychology*, 70(2), 97-116.
- Vellutino, F.R. Scanlon, D.M., Small, S., & Fanuele, D.P. (2006). Response to intervention as vehicle for distinguishing between children with and without reading disabilities. *Journal of Learning Disabilities*, 39, 157-69.
- Wagner, R. K., Torgesen, J. K., Rashotte, C. A., Hecht, S. A., Barker, T. A., Burgess, S. R.,

- Donahue, J., & Garon, T. (1997). Changing relations between phonological processing abilities and word-level reading as children develop from beginning to skilled readers: A 5-year longitudinal study. *Developmental Psychology*, 33, 468-479.
- Weiss B. D., Hart G., McGee D. L., D'Estelle S. (1992). Health status of illiterate adults: relation between literacy and health status among persons with low literacy skills. *Journal of the American Board of Family Practice*, 5, 257-64.
- Welsch, J. G., Sullivan, A., & Justice, L. M. (2003). That's my letter!: What preschoolers' name writing representations tell us about emergent literacy knowledge. *Journal of Literacy Research*, 35(2), 757-776.
- West, J., Denton, K., & Germino-Hausken, E. (2000). America's kindergartners. Washington, DC: National Center for Education Statistics.
- Whitehurst, G. J., & Lonigan, C. J. (2010). *Get ready to read!—Revised edition*. San Antonio, TX: Pearson Assessments.
- Wilson, S. B., & Lonigan, C. J. (2009). An evaluation of two emergent literacy screening tools for preschool children. *Annals of Dyslexia*, 59(2), 115.

Table 1

Demographic Information for Children with Identified Risk for Later Literacy Difficulties and Their Peers

Characteristic	Identified Risk				Peer			
	<i>n</i>	%	<i>M</i>	<i>SD</i>	<i>n</i>	%	<i>M</i>	<i>SD</i>
Age (months)	62		50.2	6.07	66		50.4	6.91
Male	27	43.5			27	40.9		
Race								
White/Caucasian	15	24.2			22	33.3		
Black/African American	30	48.4			29	43.9		
Other/multiracial	8	12.9			12	18.2		
Ethnicity								
Hispanic or Latinx	9	14.5			5	7.6		
Maternal education								
Less than high school diploma	4	6.5			8	12.1		
High school diploma or GED	9	14.5			8	12.1		
High school diploma or GED plus technical training	12	19.4			7	10.6		
Some college but no degree	22	35.5			18	27.3		
2-year degree	5	8.1			6	9.1		
Bachelor's degree	6	9.7			10	15.2		
Graduate degree	1	1.6			6	9.1		
Annual household income ^a								
Less than \$25,000	34	54.8			25	37.9		
\$25,001-\$75,000	21	33.9			22	33.2		
More than \$75,001	3	4.8			13	19.7		

^aAnnual household income was collapsed into three categories for descriptive purposes for this table; however, it was measured in increments of \$10,000 and considered as a continuous variable in analysis.

Table 2

Descriptive Statistics and Group Comparisons for Preschool Children with Identified Risk for Later Literacy Difficulties and Their Peers

Variable	Identified Risk				Peer			
	min	max	<i>M</i>	<i>SD</i>	min	max	<i>M</i>	<i>SD</i>
Name writing	1	4	2.22	0.91	1	4	2.61*	1.12
Horizontal	0	1	0.43	0.49	0	1	0.66*	0.48
Directionality	0	1	0.42	0.49	0	1	0.65*	0.48
Capitalization	0	1	0.09	0.29	0	1	0.12	0.33
Letter writing								
T	0	4	1.77	1.10	1	4	2.76	1.38
B	1	4	1.72	1.05	0	4	2.53	1.37
H	0	4	1.66	1.02	0	4	2.64	1.38
M	0	4	1.46	0.85	1	4	2.38	1.35
S	0	4	1.35	0.78	0	4	2.26	1.37
A	1	4	1.57	0.97	0	4	2.43	1.37
D	1	4	1.63	0.95	1	4	2.33	1.33
C	0	4	1.45	0.92	0	4	2.56	1.47
J	0	4	1.46	0.85	0	4	2.09	1.37
P	0	4	1.52	0.89	0	4	2.18	1.39
Letter writing (composite) ^a	1	3	1.56	0.65	1	4	2.39***	1.08
Invented spelling								
Sad	1	2	1.22	0.41	0	4	1.48	1.01
Hug	0	2	1.20	0.43	0	4	1.53	0.87
Lip	0	2	1.15	0.44	0	5	1.58	0.88
Net	0	2	1.14	0.43	0	5	1.47	0.86
Job	0	2	1.20	0.47	0	4	1.49	0.77
Invented spelling (composite) ^a	0	2	1.18	0.35	0	4	1.50**	0.78
Composition								
Association	0	2	0.98	0.33	0	2	1.21*	0.54
Complexity (# of letters)	0	5	0.63	1.30	0	5	1.38*	2.01
Complexity (# of words)	0	0	0.00	0.00	0	2	0.06	0.29

Note. Asterisks displayed indicate significant group differences on composite writing scores. Min = lowest value scored by a child; max = highest value scored by a child. * $p < .05$, ** $p < .01$, *** $p < .001$.

^aComposite scores for letter writing and invented spelling were calculated by finding the average across all 10 letters and all 5 CVC words.

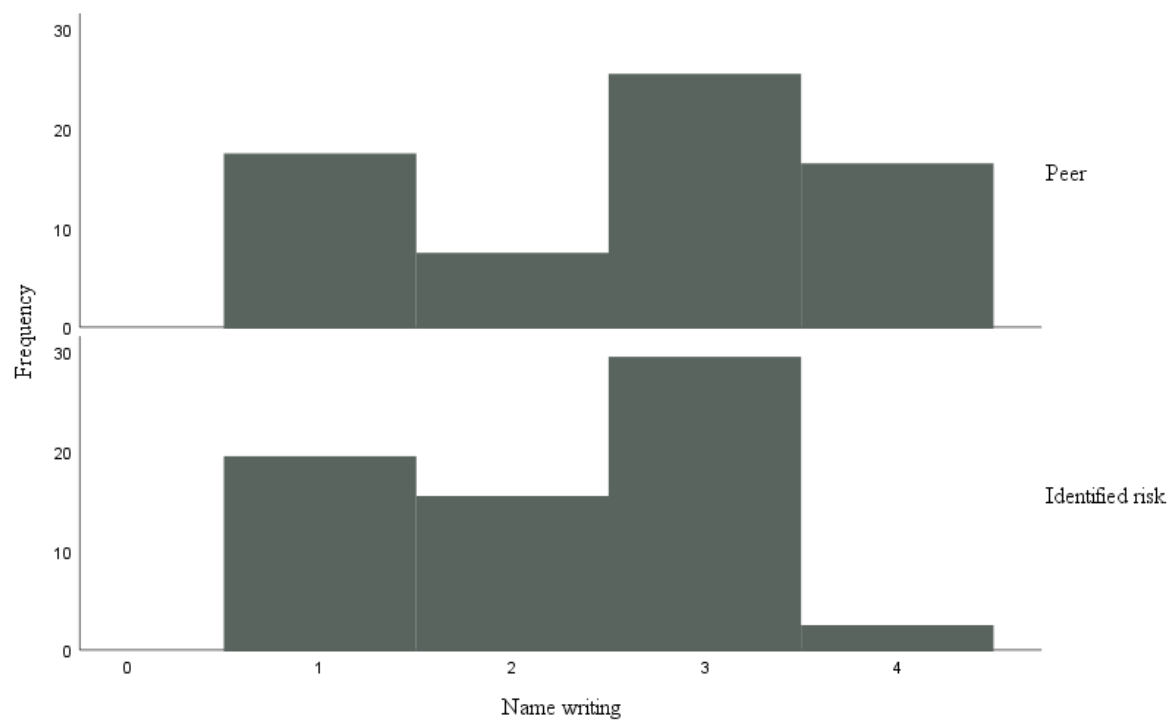


Figure 1. Split histogram depicting the name writing skills of children identified as at-risk for later literacy difficulties and those not identified as at-risk; 0 = refusal/no response, 1 = drawing and/or scribbling, 2 = letter-like shapes, 3 = letters, 4 = named spelled correctly.

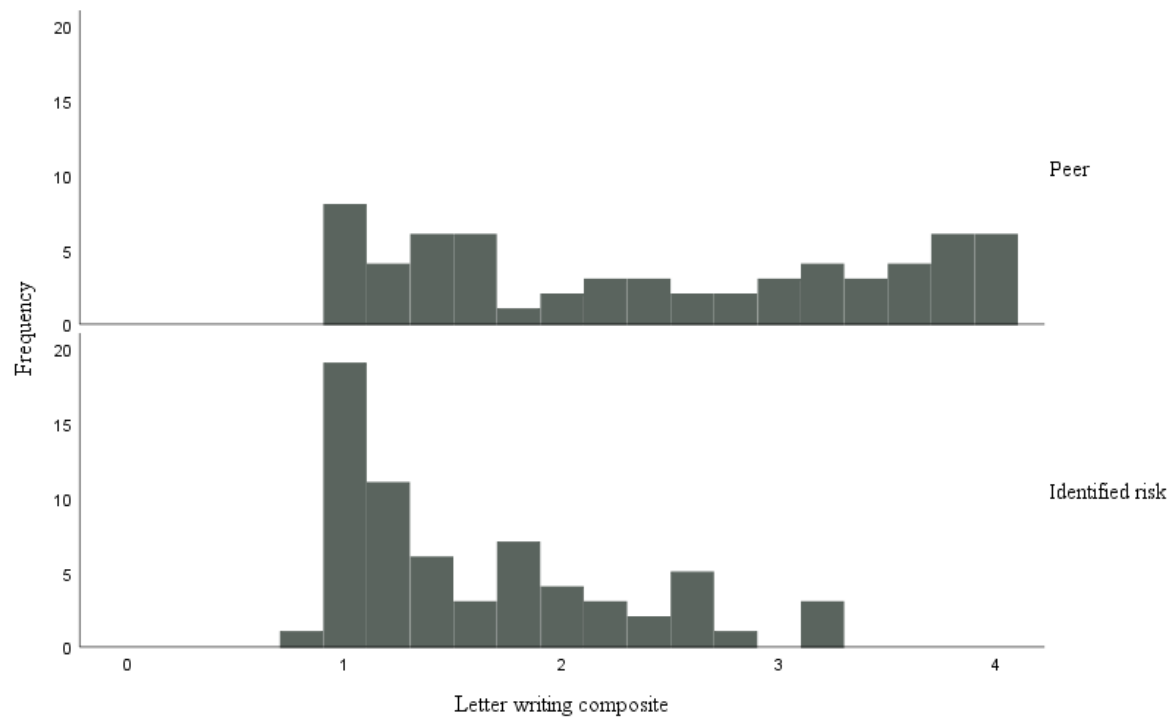


Figure 2. Split histogram depicting the average letter writing skills of children identified as at-risk for later literacy difficulties and those not identified as at-risk; 0 = refusal/no response, 1 = drawing and/or scribbling, 2 = letter-like shapes, 3 = letter, 4 = correct letter.

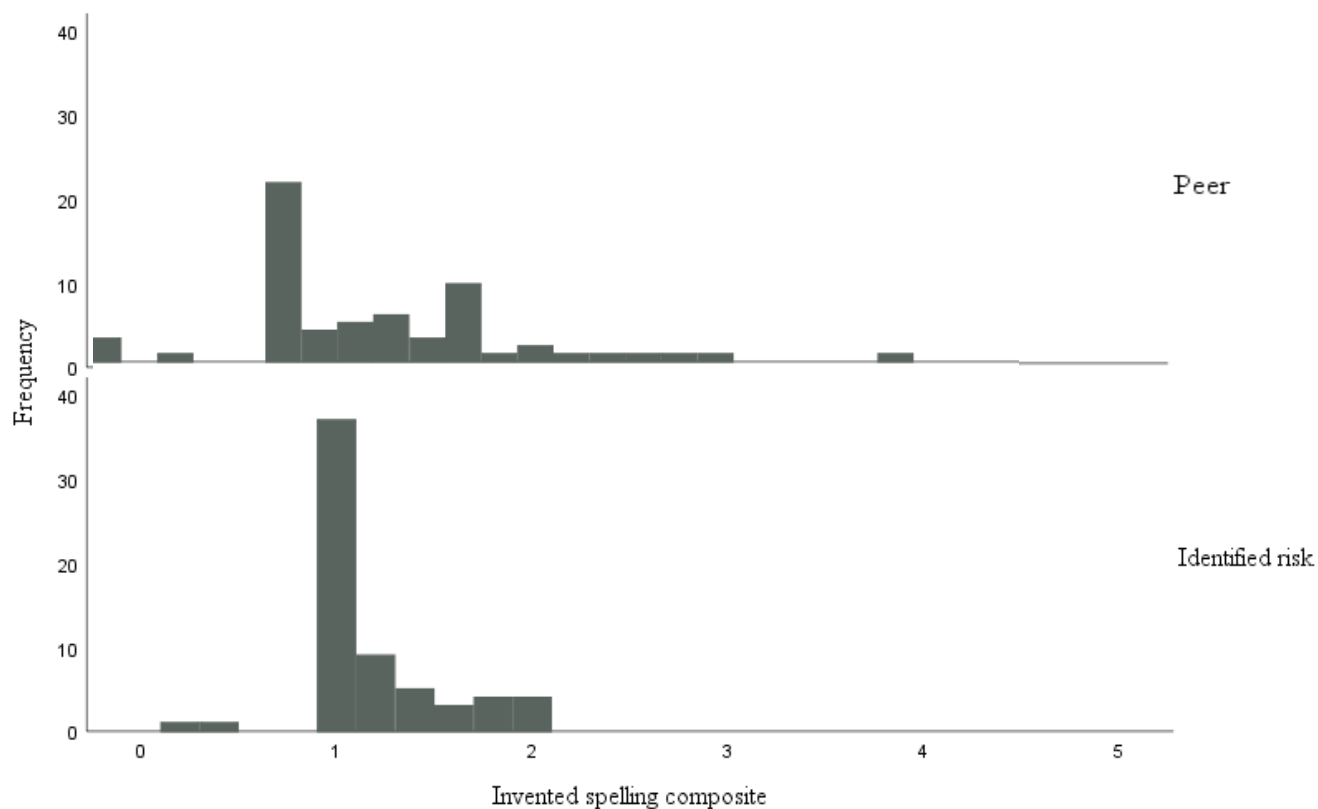


Figure 3. Split histogram depicting the average invented spelling skills of children identified as at-risk for later literacy difficulties and those not identified as at-risk; 0 = refusal/no response, 1 = drawing and/or scribbling, 2 = letter-like shapes, 3 = initial/salient sound, 4 = more than one sound, 5 = word spelled correctly.

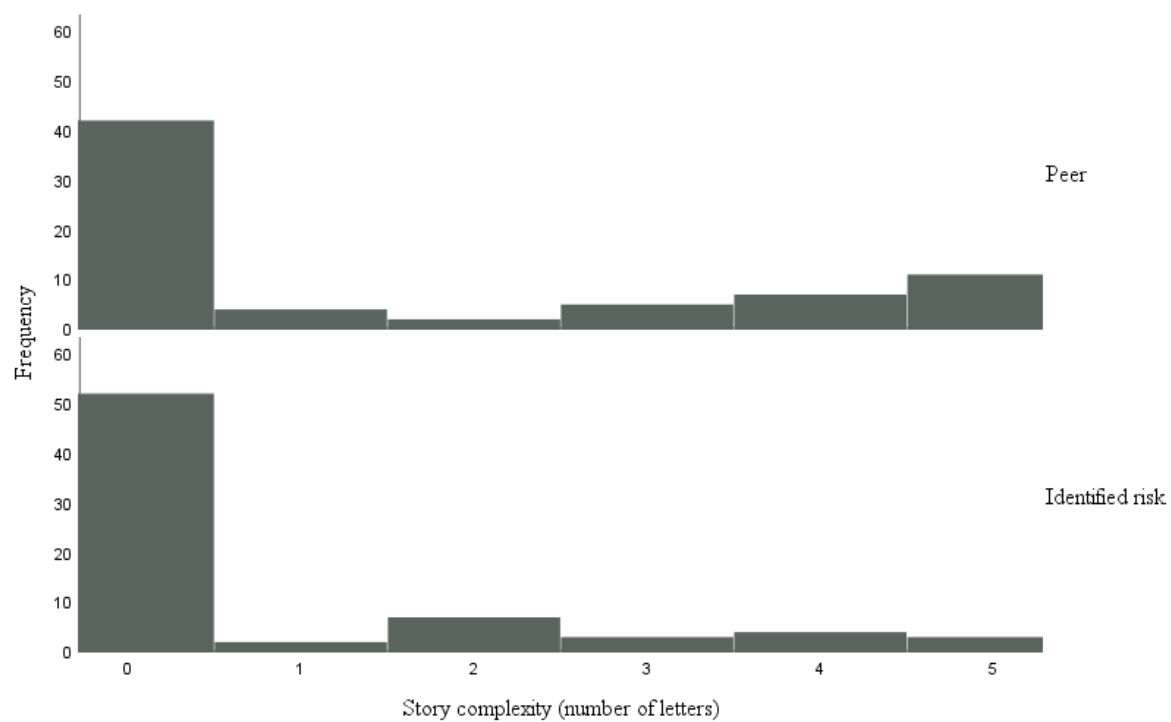


Figure 4. Split histogram depicting the story complexity skills (via number of letters) of children identified as at-risk for later literacy difficulties and those not identified as at-risk.